

PATENT
ATTORNEY DOCKET NO: 0305/004001CUSTOMER-BASED PRODUCT DESIGN MODULE

5 This application is a continuation-in-part of United States Patent Application Serial Number 07/926,333, filed August 6, 1992.

Background of the Invention

10 The growing speed of product development (with shorter time to market, rapid addition of new product features and transformation of many products due to technological change) makes the ability to measure and deal with complexity considerably more difficulty. The rate of product evolution in many product categories has become faster than ever, so measurement methods must evolve to keep
15 pace with the speed and scope of business decision making. Unfortunately, it still generally takes 30 days or more to run many types of meaningful studies in areas like human factors product testing, market research and product field trials. Such labor-intensive studies, conducted by degreed
20 professionals, are also expensive. Since many product design decisions will not wait or do not have the budget, they are made without the benefit of in-depth customer-based studies that would make those decisions clearer, simpler and more accurate.

25 In some areas current test methods are immature and only partly assist in making crucial product decisions. For example, a growing number of software and computer-integrated products (which may actually be built around a special purpose computer such as a medical monitor)
30 aim to enhance customer performance, problem solving abilities and complex types of thinking. While learning tests are able to determine whether or not a product's users have learned the procedures for using that product, it remains difficult to assess complex thinking skills and

This may help transform the increasingly everyday environment of built-in computing into a two-way system for meeting both vendor and customer needs faster, more accurately and more effectively. Since this technology is scaleable, it doesn't matter whether the focus is:

- .One vendor's product in one customer's hands,
- .All of that vendor's products in use in one country,
- .The marketplace for those types of products in that country, or
- .Multiple markets around the world.

Since this through-the-product communications may be used to transform customer-vendor relationships, results may include:

- .Products that can learn from and work with individuals or groups in new ways, or
- .Markets that employ these new built-in communications/information systems to provide new benefits such as additional market efficiencies, built-in marketwide user performance support systems, or accelerated economic growth for individual vendors or national economies.

Everyone talks back to products, but not with words they can repeat in public. Think how customers would guide products and services toward what they want if they could really talk back while they use a product, both when they have a problem and when they have an unmet need. Vendors might find an alive marketplace that helps them improve products, services and business relationships.

A number of service industries, such as market research and product testing, seek to help vendors

The architecture includes varying components and features 662, 670, 672, 664 in Fig. 17 that form a continuous learning and communications system 666, 674 between vendors and customers. A logical starting point is the authoring system 662 on the computer of the vendor 660. This is used to construct automated interactions and download them 666 to CB-PD Modules in products 670. Vendor employees run the authoring system on their computer(s).

The CB-PD Module 670 obtains its findings while customers are in the middle of product uses 668, during their real situations and needs. This has the potential to transform the role of Customers from remote and only partly understood consumers into design partners with vendors 672, 674. By automating these critical connections and the analysis of customer needs 664, this may produce faster, more accurate and profitable working relationships between vendors and customers.

With a mainframe computer, minicomputer, Local Area Network (LAN) or another computer system at the vendor, the Defined Customer Desires (DCD) may be made available on-line 664. While each organization would decide which managers and employees should have access to this data, there is considerable opportunity to expand the connections between customers and employees throughout vendor organizations. At the same time, the CB-PD Module is an unobtrusive product feature. It is largely invisible to vendors and customers except when (1) the vendor sets up this Module 662, (2) customers engage in Development Interactions during some of their uses of a product or service 670, and (3) when vendor management requests or receives a processed report 664.

Description

An integrated set of components enables this technology as a new communications media in products for

expanded two-way, interactive relationships between customers and vendors. Over time, these new relationships might even produce an evolution of free market economies toward increasingly responsive processes (see below for an initial description). If that evolution does begin, the companies that fail to add this type of interactivity to their products (where this is an appropriate addition added by their competitors) might grow increasingly out of touch with a faster-moving world that includes two-way opportunities to improve products and services rapidly -- a new normal way to do business in a networked world.

Brief Description of the Drawing

The above and other features and advantages of the present invention will become apparent from the discussion below of specific, preferred embodiments presented in conjunction with the accompanying drawings. It is to be understood that the drawings are designed as an illustration only and not as a definition of the limits of the invention.

Fig. 1 is a flow chart of the Customer Design System (CDS).

Fig. 2 is an illustration of the front view of a Customer-Based Product Design Module (CB-PD Module).

Fig. 3 is an illustration of a Customer Directed Product (CDP).

Fig. 4 is an illustration of a Customer Data Reader/Programmer (CDRP).

Fig. 5 is an illustration of a CB-PD Module directly transmitting Aggregate Customer Desires (ACD) data through the telephone network.

Fig. 6 is a block diagram of a Customer-Based Product Design Module (CB-PD Module).

Fig. 7 is a block diagram of a Customer Directed Product (CDP).

Fig. 8 is a flow chart of the Instrument Design Repository (IDR).

5 Fig. 9 is a flow chart of the Instrument Design Repository (IDR).

Fig. 10 is a flow chart of Development Interactions (DI).

10 Fig. 11 is a flow chart of transmission with optional security procedures.

Fig. 12 is a flow chart of the growth of Aggregate Customer Desires (ACD) databases.

Fig. 13 is a flow chart of a Customer-Based Product Design Report (CB-PDR) system.

15 Fig. 14 is an illustration of a recommended reporting format for Customer-Based Product Design Reports (CB-PDR).

Fig. 15 is an illustration of the invention's geographic scope.

20 Fig. 16 is an illustration of the invention's longitudinal scope during product, application, business process, and other system life cycles.

Figs. 17, 18 and 20 are illustrations of components, architecture and processes.

25 Fig. 19 is an illustration of the invention's open communications, e.g., its digital environment for supporting companies, products and markets.

30 Figs. 21, 24, 25, 27, 28, 29, 30, 31 and 32 are illustrations of various views of some uses of the invention.

Figs. 22 and 23 are illustrations of one type of trigger events and a flowchart for displaying relevant interactions triggered by product use.

Fig. 26 is an illustration of the invention's systems for protecting privacy, confidentiality and market integrity.

Fig. 33 is an illustration of the invention's re-use of components, thus producing savings in time, cost, etc.

Fig. 34A, 34B is a flowchart of the application of the invention to (existing and new) product environments and digital environments.

Description of the Preferred Embodiments

Components of This Invention

To facilitate the description of the invention, it is worthwhile to define some conventions solely for this purpose. These conventions are somewhat arbitrary and should not be construed as limiting to the generality of the invention. For the purpose of this description:

(a) Customer Directed Product (CDP): An interactive product includes a CB-PD Module (which may be attached to a product or built into it); a CDP interacts with the Customer, or the Customer may initiate interactions with a CDP; these interactions are by means of the CB-PD Module.

(b) Customer Design System (CDS) is the overall, interactive system by which the Customer provides design information to a Vendor.

(c) Customer Design Instrument (CDI) is a specific set of Customer Probes (CP) that are intended to elicit the raw data, which are called Aggregate Customer Desires (ACD).

(d) Customer Probes (CP) are the prompts, questions, etc stored in a CB-PD Module for interacting with a Customer.

(e) Instrument Design Repository (IDR) is a stored set of Customer Probes (CP) that are available, as

points are checked in the CB-PD Module 18. These trigger points may be initiated by the CB-PD Module or by the Customer. If a trigger point has not been reached, the Customer's use is not interrupted. If a trigger point is reached, the CB-PD Module requests the Customer's participation in a Development Interaction (DI) 20. If the Customer says no, then that trigger point is passed without a DI occurring. If the Customer agrees, a Development Interaction is performed 22. This includes running the Customer Design Instrument (CDI) and recording the Aggregate Customer Desires (ACD) 24, which are comprised of the Customer's responses during the Development Interaction. The Aggregate Customer Desires are delivered to the Vendor 26 where they are entered into an Aggregate Customer Desires (ACD) database. Periodically, a report is run 28 which analyzes the aggregate data into Defined Customer Desires (DCD) comprised of the Customer's views and suggestions during that period. This is presented in an on-line or printed Customer-Based Product Design Report (CB-PDR) 28. This Customer information is used to help improve products, services, marketing and other areas of business operations 30, and is fed back into an iterative design 12. Whenever needed, the Customer Design Instrument is updated 14, and distributed by a variety of means (such as including it in the new products sold) to Customers.

The Customer Design System (CDS) in Fig. 1 provides the Vendors that use it with customer-based product and market development information 30, based on a Customer-Vendor NETWORK 14, 24, 26, 30 that is built into appropriate Customer Directed Products (CDP) 12 by means of a CB-PD Module 14. Vendors may employ this new source of Customer information 30 whenever they wish to improve their product design decisions 12. The Vendors may also use this

add new ones, or modify existing ones. Next, the user could move the probes into the order desired.

As another example, for printing or saving a Customer Design Instrument (CDI), some of the operations 264 may include:

- .Select Probes,
- .Save Customer Design Instrument with just Selected Probes,
- .Save Customer Design Instrument with all Probes (archive), etc.

When the file is saved, the Customer Design Instruments (CDI) are linked with the appropriate trigger points to display them and record the Customers' answers. If specific Customer Probes (CP) must be asked individually at specific trigger points, these are linked at this time as well.

At any time, the user may end the current operation 264 and switch 268 to another function 216, 224, 232, 238, 244, 252, 258 or operation 262, 264. If the user wants to switch to another file or function 268, the user is offered the option to save the area being worked on 270.

On the computer screen, one of the possible interfaces is illustrated in Fig. 21. In the left window 782 the triggers 783 are listed. The right window 787 lists Development Interactions 788. On a menu 780 the views 784, 786 may be a drop-down list or any other means of selection or access. The languages in which that particular Development Interaction is available may be indicated, such as at the bottom 790.

One window displays the trigger events in the product 782 -- the points where the module can be programmed to wake up automatically during use and run a stored (term for interaction) with users 783. The parameters may include

Development Interactions (DI)

Turning now to the drawing, Fig. 10 illustrates a flow chart of data processing for conducting Development Interactions (DI) by a Customer Directed Product (CDP) by means of its CB-PD Module.

To characterize Fig. 10 in overview, two means are used to illustrate the performance of a Development Interaction (DI):

- 10 Vendor Initiated Interactions (VII) are product Development Interactions (DI) that are triggered at specific events determined by the Vendor Examples include:

15 .Installation (triggers may include at the beginning, during or just after product installation; to test components of the steps involved in installation, such as the user interface and any problems encountered),

20 .Frequency of use (triggers are based on frequency of use, such as during each Nth use of the product; this may be a self-adjusting algorithm that is linked to the clock/calendar circuit, so that it lengthens the time between Vendor Initiated Interactions (VII) if the product is used frequently, and shortens the time between Vendor Initiated Interactions (VII) if the product is only used infrequently, or another approach that may be included and selected by the Vendor), or

25 .Sudden change in use rate (trigger is based on evaluating the pattern of use by time stamping each use and measuring the actual pattern against a pre-set pattern, or against the pattern during preceding periods; when the actual usage rate speeds up or slows down by more than a set amount or percentage, the CB-PD Module conducts a CDI to

may be downloaded and stored 846, keeping the CB-PD Module able to learn from users in the best new ways identified over time 848); at a third level 850 users pre-filter the events and the available data based on what they believe is worth providing 852; producing a focused data set from the interactions 854 that is more appropriate for analysis and learning from the particular users 850 who provide it.

Participation not required: Development

Interactions (DI) should be non-intrusive; no Customer should be required to participate in this or answer any specific question that they don't want to answer. It is recommended that the user interface should be designed so that in each Development Interaction (DI) a Customer may first decide whether or not to participate 288. If a Customer chooses to not participate, record a "declined to participate" response 287.

Similarly, users may set others controls to operate the CB-PD Module 284, 882 in Fig. 24 (such as the frequency of interruption, user privacy and the anonymity of data sent from the product, whether or not the user's data is sent or sold to third parties other than the vendor, etc.).

Doing the Development Interaction (DI): For each Customer Probe 294 receive the customer's answer 296 by reading the appropriate Customer input device(s) 296 for that Customer Directed Product (CDP). Test for errors 300 (such as whether the input key pressed is within the range of acceptable answer keys). If an error is present display an error message 302 (which message may be specific to that type of error, rather than a general error message) then redisplay the previous Probe 294. If an error is not present, the Customer's answer may optionally be encrypted 304. Then write the answer to a data file 304 and determine if there are any more Customer Probes (CP) in the Customer

(2). access remotely located experts to jointly engage in a design sessions on either or both computers 722,

(3) electronically select sets of interactions to electronically mail to specific experts for independent review, revision, augmentation, implementation planning, etc.; then receive their revisions electronically and review them by means of the Instrument Design Repository (IDR) systems and controls 720, 722, 724,

(4) electronically delegate the authoring of interactions, tools to assist in employing or automating this component of the invention, models or simulations, product field trials, etc. to a remotely located expert(s). receive their sets of interactions or other work product electronically and review them on-screen by means of the invention 722, 724.

(5) access vendor experts electronically (such as at communications services vendors, hardware, software, consulting firms, etc.) while engaged in working on the Instrument Design Repository (IDR) to plan communications strategies, networks, equipment purchases, monitoring services, communications services, etc. 722, 724,

(6) access billing services (such as credit-card vendors, on-line invoicing, etc.) to bill for and pay for any services or products received 730,

(7) Etc.

.Customer-Based Product Design (CB-PD) Modules in products 724: On-line communications may be

enterprise-wide information systems, internal corporate software applications, manufacturing systems and back-office automation. In business information systems, which have increasingly become the normal infrastructure for business operations, on-the-spot Development Interactions (DI) can immediately gather information from users 1140, 1144 in Fig. 33 to track where problems occur, which needs are unfulfilled, what requirements are changing, etc. Those analyses can be distributed right away to those who need to fix specific problems or pro-actively meet new needs before they become problems 1140, 1144, yielding opportunities for iterative improvements, continuous re-engineering, or performance breakthroughs.

These capabilities are embodied in this invention's replicable systems, so that once developed they can be applied rapidly and less expensively to new products and services 1140. This re-use, throughout a company's networks and product lines 1142, 1144, lowers the cost of successive uses. For example, there is a high cost for the first product with a CB-PD Module and related components, but the fifth or tenth product with such a Module is able to take advantage of a growing range of re-usable components and features in that company's systems, so it may be added at a much lower cost.

Automated Customer-Based Product Design Reports (CB-PDR), as close as the computer screen at one's elbow, would help compress the innovation cycle by producing Customer-based direction for continuous increases in both customer satisfaction and sales. The result could be the development of a direct partnership between Customers and Vendors to engage them, as a cooperative "marketplace community", in creating the improvements that they want -- faster and sooner -- as a normal part of product use.

1 1. A system for use with a product, comprising
2 a user interface which is associated with the
3 product and enables local bi-directional communication,
4 between a user of the product and the product, of local
5 information concerning use of the product,
6 product information which is related to the local
7 information and is communicated between the product and a
8 remote party other than the user, and
9 means for taking action with respect to the
10 product or the user interface based on the product
11 information.

1 2. The system of claim 1 further comprising
2 an authoring system for use by the remote party for
3 managing the content of the local information and of the
4 product information.

1 3. The system of claim 1 further comprising
2 an analyzer of product information received at the
3 remote party, and

4 means for controlling the taking of action with
5 respect to the product or the user interface in response to
6 the analyzer.

1 4. The system of claim 1 wherein the product
2 information includes new interface elements and is
3 communicated from the remote party to the product.

1 5. The system of claim 1 wherein the user interface
2 comprises a product module which may be disabled and enabled
3 selectively.

1 6. The system of claim 5 wherein the module may be
2 enabled in response to a trigger event.

1 7. The system of claim 6 wherein the trigger event
2 is initiated locally at the product.

1 8. The system of claim 6 wherein the trigger event
2 is initiated by the remote party.

1 9. The system of claim 1 wherein the local
2 information concerning use of the product is generated
3 during use of the product.

1 10. The system of claim 1 wherein the user
2 interface communicates queries to the user during use of the
3 product.

1 11. The system of claim 10 wherein the queries are
2 determined by the nature of the use of the product.

1 12. The system of claim 1 wherein responses to the
2 queries are stored in the product.

1 13. The system of claim 5 wherein the module
2 comprises hardware and software.

1 14. The system of claim 1 wherein the user
2 interface comprises one or more of a display screen, a
3 keyboard, a keyboard, a microphone, and a speaker.

1 15. The system of claim 1 wherein the means for
2 taking action changes the interactions permitted with the
3 user.

1 16. The system of claim 1 wherein the communication
2 between the product and the remote party passes via one or
3 more of broadcast transmission, wire, or a removable memory
4 device.

1 17. The system of claim 3 wherein the analyzer
2 analyzes product information for received at the remote
3 party from multiple users with respect to multiple products.

1 18. The system of claim 1 wherein the user
2 interface includes a natural language component.

1 19. The system of claim 18 wherein the user
2 interface includes multiple natural languages, selectable by
3 the user.

1 20. The system of claim 1 wherein the occurrences
2 of communication between the user and the product are
3 controlled by the user.

1 21. The system of claim 20 wherein the user is
2 enabled to terminate a communication with the product at
3 will.

1 22. The system of claim 1 wherein the user
2 interface includes a user control for selectively enabling
3 or disabling the user interface.

1 23. A method for aiding design of a product
2 comprising
3 creating a first version of the product,
4 including with the first version a user feedback
5 element which accumulates information on use of the product
6 by a user,
7 recovering the information from the user feedback
8 element,
9 analyzing the information, and
10 redesigning the product in accordance with the
11 results of the analyzing step.

1 24. The method of claim 23 wherein the information
2 includes information provided by the user with respect to
3 problems in use of the product.

1 25. The method of claim 23 wherein the information
2 includes information provided by the user with respect to
3 solutions to problems in use of the product.

1 26. The method of claim 23 wherein the information
2 includes information provided by the user with respect to
3 usability of the product.

1 27. The method of claim 23 wherein the information
2 includes demographic marketing information about the user of
3 the product.